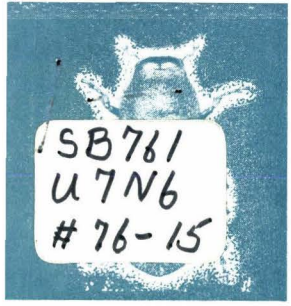
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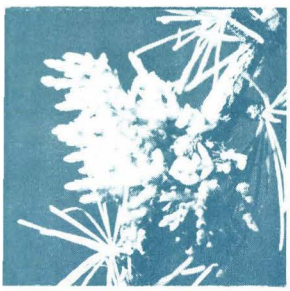

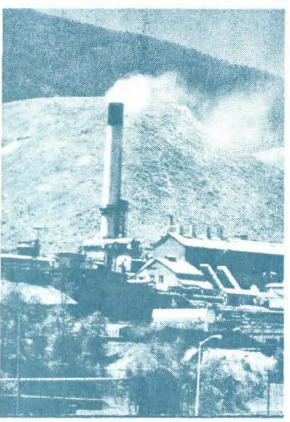

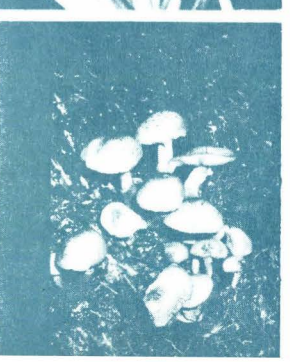

FOREST ENVIRONMENTAL PROTECTION

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EVALUATION OF PROPOSED DWARF MISTLETOE AND WESTERN SPRUCE BUDWORM MANAGEMENT PROJECTS CRAMER CREEK, GARNET RESOURCE AREA BUREAU OF LAND MANAGEMENT

By

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Plant Pathologist

SUMMARY

Lodgepole pine on several of the areas is heavily dwarf mistletoe infested. Removal of infested lodgepole pine will effectively reduce dwarf mistletoe to an insignificant level and increase volume yields in the future. The cost/benefit ratio is favorable. Removal of Douglas-fir heavily damaged by the western spruce budworm to favor those showing an apparent resistance to attack is a logical approach to solving the budworm problem. A cost/benefit ratio for silvicultural management of the western spruce budworm has not been determined.

INTRODUCTION

The Bureau of Land Management (BLM), Garnet Resource Area, has proposed a sanitation thinning in FY 1977 on 55 acres in the Cramer Creek area on the Missoula District. This area was evaluated on October 8, 1976, by Oscar Dooling and Leo Rhein, BLM. They also evaluated several additional areas for management activities to be accomplished in FY 1978 and beyond as funding becomes available.

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TECHNICAL INFORMATION

Causal agents.--Lodgepole pine dwarf mistletoe, *Arceuthobium americanum* Nutt. ex Engelm. (DM).

Western spruce budworm, *Choristoneura occidentalis* Freeman (WSBW).

Hosts.--DM: Lodgepole pine, *Pinus contorta* Dougl. (The area is outside the range of the Douglas-fir dwarf mistletoe).

WSBW: Douglas-fir, *Pseudotsuga menziesii* (Beissn.) Franco; and subalpine fir, *Abies lasiocarpa* (Hook.) Nutt.

Type of damage.--Both causal agents: Reduction of tree vigor, height and diameter growth, and some mortality. WSBW: Top dieback.

Description of Areas and Proposed Treatments

General location of the proposed project areas is shown in Figure 1. Specific areas discussed below are shown in Figure 2.

Area 1, 72-year-old lodgepole pine.--No dwarf mistletoe is evident on the lodgepole component of the stand. The understory is Douglas-fir and subalpine fir. The treatment proposed is to thin the lodgepole pine overstory and retain as much of the understory as possible. The lodgepole pine have good crown lengths, and should release. Budworm damage in the understory is extremely light, probably due to a lack of susceptible overstory trees.

Area 2, adjacent to 72-year-old stand.--Nearly all lodgepole pine, both overstory and understory, is heavily dwarf mistletoe infested. The proposed treatment is to log the lodgepole pine/Douglas-fir overstory and then thin the residual stand. Most nonmerchantable lodgepole pine will be removed during thinning. The understory is composed primarily of Douglas-fir; budworm damage in this understory is moderate. Thinning will remove the more obviously damaged Douglas-fir and leave those trees showing some apparent resistance to budworm.

Area 3, triangle adjacent to road.--Both overstory and understory lodgepole pine are heavily dwarf mistletoe infested. The proposed treatment is to remove the overstory and thin the understory, favoring the more budworm resistant Douglas-fir reproduction.

Area 4, 55-acre relog area.--This area is proposed for treatment in FY 1977. Lodgepole pine is heavily dwarf mistletoe infested. The understory is heavily stocked with Douglas-fir and lodgepole pine. Understory lodgepole pine will be removed and the Douglas-fir thinned. Some clumps of Douglas-fir show individual trees apparently resistant to budworm; these trees will be favored in thinning. Most of the merchantable lodgepole pine will be left for a future commercial sale.

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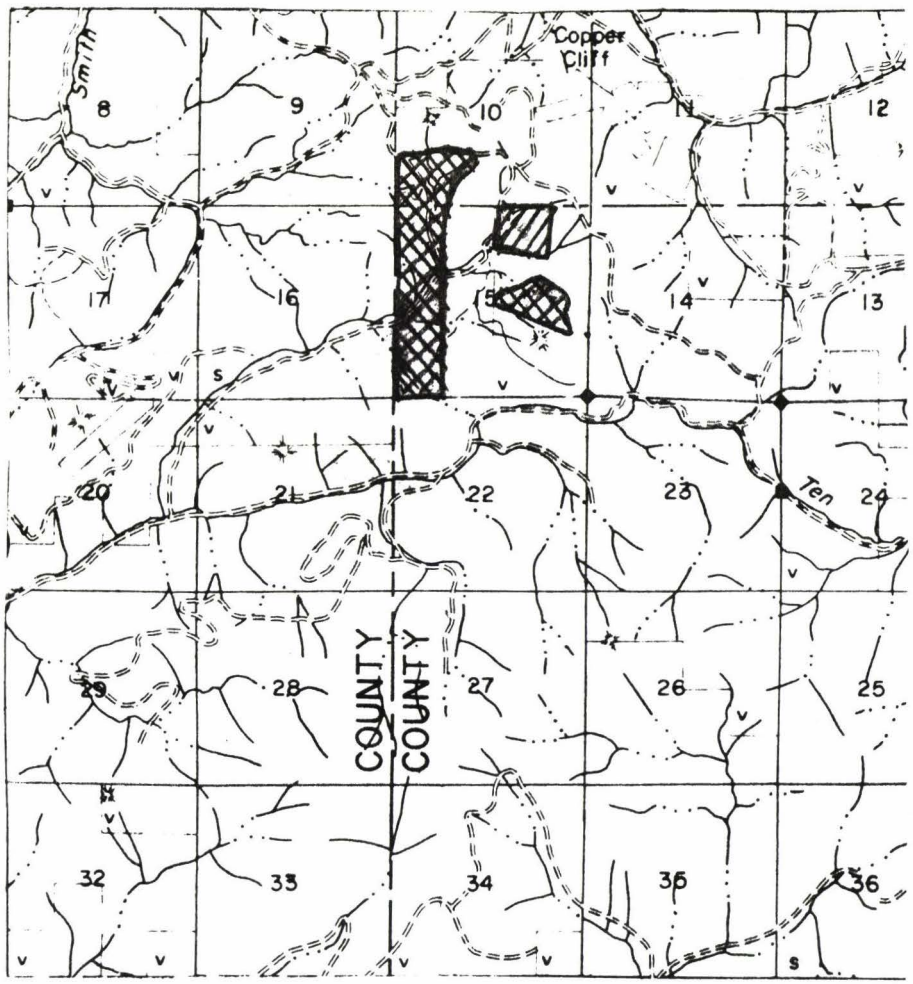

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Figure 1.--Proposed dwarf mistletoe and spruce budworm control projects, Cramer Creek area, Garnet Resource Area, Bureau of Land Management

Location of proposed FY 1977 dwarf mistletoe project.

Location of future projects as funding becomes available.

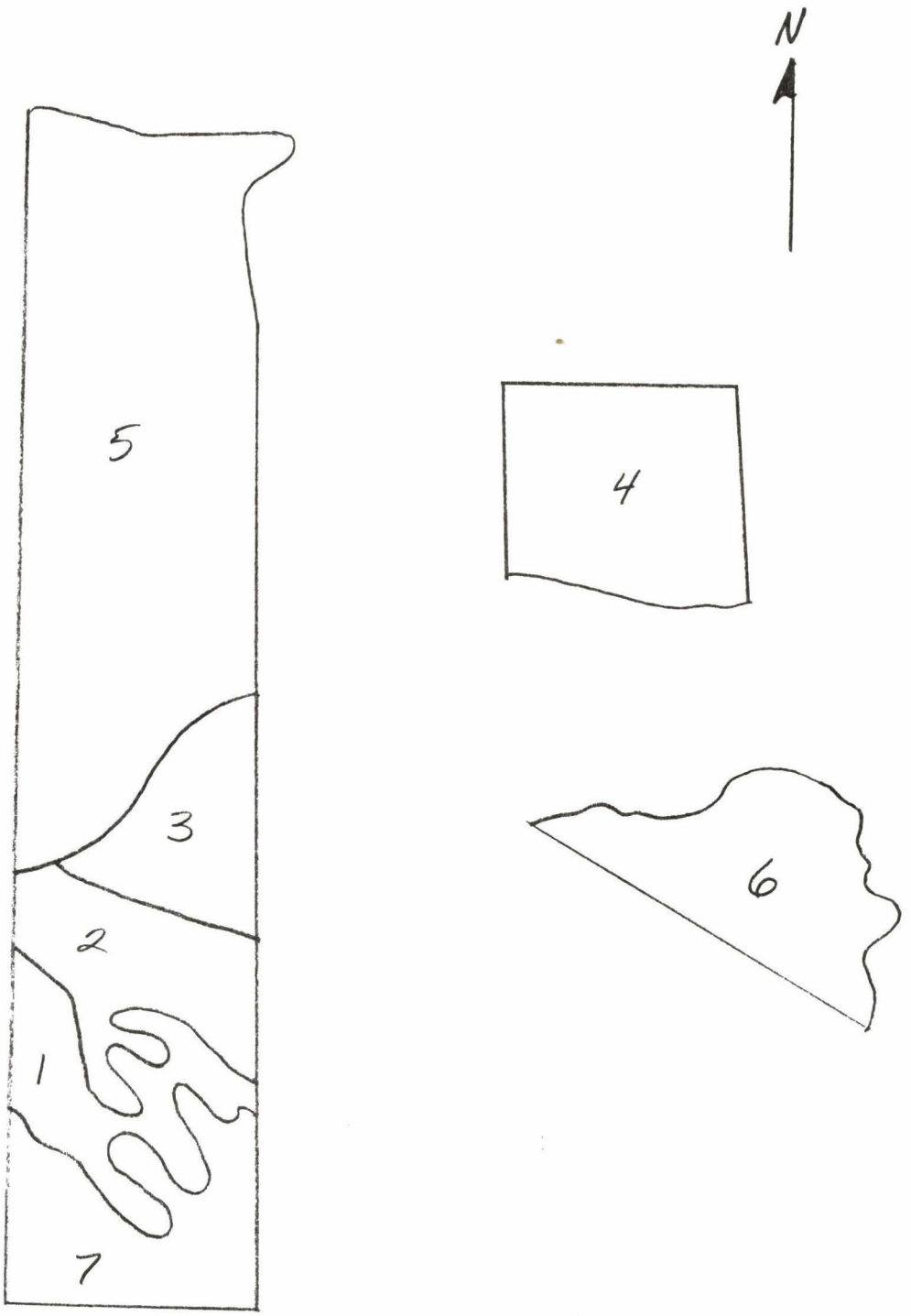

Figure 2.--Stand outlines of proposed dwarf mistletoe and spruce budworm control projects referred to in text.

Scale: Approximately 5½" = 1 mile.

Area 5, 126-acre area.--Dwarf mistletoe is apparent in the lodgepole pine. Budworm damage to the Douglas-fir is moderate to heavy, with some apparently resistant trees evident. The proposal is to thin the understory, favoring the budworm-resistant Douglas-fir. The merchantable lodgepole pine and Douglas-fir will be left for a later commercial sale.

Area 6, the "desert".--This stand is pure Douglas-fir overstory, with no reproduction. The youngest trees appear to be about 40 years of age. Budworm damage is quite heavy. Lack of reproduction is probably due to a combination of budworm damage to cones and a sod cover throughout much of the area. Older cones on the ground all show evidence of budworm damage. The proposal is to underplant with lodgepole pine, and after it is established, remove the Douglas-fir overstory by a commercial sale. Slash will be lopped and scattered to discourage excessive use of the area by cattle and reduce potential for buildup of Douglas-fir bark beetle.

Area 7, Douglas-fir fringe area.--This stand is primarily Douglas-fir, with some lodgepole pine toward the eastern end. There are also a few scattered western larch, *Larix occidentalis* Nutt. Budworm-caused top kill occurs in the stand, but many individual trees have 14- to 16-inch leaders with little apparent damage. Lodgepole pine that is present is free of dwarf mistletoe. The proposal is to thin the stand from below, leaving overstory trees for a later commercial sale. Understory Douglas-fir that will be retained will be those individuals showing the least amount of budworm damage.

DISCUSSION

Dwarf mistletoe is responsible for the most serious disease losses in the lodgepole pine forests of central Montana. Growth losses of 50 percent or more are common. Dwarf mistletoe not only causes growth loss and direct mortality, but also predisposes trees and entire stands to attack by other disease organisms and insects. Nonsusceptible species should be favored in thinning sanitation. The planned approach for all areas discussed concurs with this recommendation.

The western spruce budworm is currently epidemic over most of the range of Douglas-fir in Montana. An environmental impact statement covering the epidemic area is being prepared to determine management alternatives to take against the budworm. One alternative under consideration is stand management to favor both nonsusceptible species and least-damaged individuals of susceptible species. Current knowledge is insufficient to say if this "least-damaged" approach is viable, but it should be attempted; this area would be an excellent test location.

COST/BENEFIT ANALYSIS

An analysis for central Montana[1/] shows a cost/benefit ratio of 1:2.42 for control of dwarf mistletoe in lodgepole pine. These figures were based on conditions at the end of FY 1973, and do not reflect current market conditions. Market conditions are expected to improve in the future and benefits of control will increase.

A cost/benefit ratio for silvicultural management of the western spruce budworm has not been determined. The benefits should be considered as normal ones derived from routine stand management activities.

RECOMMENDATIONS

Decision for control.--Dwarf mistletoe control is recommended and is both biologically and economically sound. Stand management to favor Douglas-fir showing the least amount of budworm damage is also recommended, primarily because it appears to be the logical long-term approach toward management of budworm populations.

Control method.--Removal of dwarf mistletoe infested lodgepole pine, heavily budworm damaged Douglas-fir, and underplanting lodgepole pine in one area are the methods selected for management.

Impact of control on other resources.--Because control will be by mechanical thinning and logging, there will be no additional adverse impact on other resources. There may be an increase in the amount of forage available for big game or livestock; and wildlife habitat should be improved. Slash resulting from the operation will temporarily increase the fire hazard, but the area is well roaded and initial attack on fires that do occur will be relatively rapid.

1/ Dooling, O. J. 1974. Dwarf mistletoe control--why and what? An appraisal of the Northern Region control program. USDA Forest Serv., Northern Region, Missoula, Mont., Insect and Disease Rept. 74-16.